Upgrading Existing County Roads

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SELECTION OF ROADS TO BE UPGRADED

The upgrading of county roads should be done with sensible plans. For a gravel road the first step up the ladder could be the addition of some sort of dust-free surfacing. For a surfaced road, which is fairly serviceable, it might be widening or the structural "beefing up" of the road to carry heavier axle loads and greater volumes of traffic. With limited county highway funds the planner must first establish a rational justification for spending money on one particular road rather than another.

Traffic Volume Survey

I do not know of any other approach to this problem except through a traffic count study of the entire county road system. The effort expended in making a reasonably accurate traffic count is returned many times simply from the psychology of having some figures to support the commissioners' decisions on where to spend the available funds. Many times an irate citizen demanding to have "his" road paved will concede when confronted with figures showing that "his" road has only a small fraction of the traffic count of the road proposed for upgrading.

Condition Survey

Along this same line is the need for a condition survey. At the least, a horseback evaluation of: (1) type and condition of surfacing, (2) pavement roughness and overall condition — rideability or some other type of subjective classification. (Is the cross section badly rutted? Is the crown too high? etc.) and (3) drainage and right-of-way inadequacies. The above information is essential to give both the highway supervisor and the commissioners a reasonably accurate overall appraisal of the needs in the area of upgrading. It will also give a reasonable approximation of the relative degree of severity of the need for improvement as compared to the need for other projects.

EXPLORATION OF SELECTED ROADS BEFORE UPGRADING

After determining the roads that have top priority for upgrading, the following decisions must be made. How much and what type of material is needed to bring the road up to the required standards? The only method I know of to answer this question, is to determine the type of soil that will be carrying the present traffic. It may seem ridiculous, but, one would be amazed at the number of public agencies that have no idea whatsoever about the materials under the surface of their roads.

Subgrade Investigations

In this category, there are two main questions which must be answered. First, what is the nature of the *subgrade* or the native soil on which the road is built? This can be determined by digging shallow test pits at the edge of the road, or by taking shallow soil borings with a post hole digger or similar tools in the road area itself. The subgrade must then be roughly classified as to load-carrying ability, and on this information, a reasonably accurate thickness design can be determined.

Determination of Existing Base Materials

Second, what is already in place just underneath the surface of the existing road? This again may sound too obvious to be worthwhile because, "Recently we spread x number of tons of gravel over that road last fall." As the experienced know, a tremendous amount of gravel can kick out under traffic in a very short period of time and incidentally, this is one of the many reasons that justify upgrading of a gravel surfaced road. Again, the only method I know of to determine this is to literally "dig for the facts," so get busy again with the pick and shovel and post hole digger.

Determination of Quantities of Materials Needed

After all of this work, one should be able to come up with a reasonably accurate idea of the quantity of materials needed to improve the road. Notice I said, "quantity of material," quality will be discussed later.

What is the Existing Geometric Design?

The remaining requirements are a bit easier to obtain information about. These are the visible defects — no more "digging for information." I'm referring to the needs for good horizontal and vertical alignment. How sharp are the curves? How abrupt are the dips and

hills? Is the sight distance, both vertical and horizontal, adequate for a safe speed of only 20 mph, when the posted speed limit is 50 or 60? Along this same line, how adequate are the steep backslopes and drainage ditches? Are they 1 on 1 when they should be 1 on 3 or 4? Steep slopes are easily eroded and the material plugs drainage ditches. Steep slopes are also hard to mow and are unsafe for motorists.

Is the R-O-W Adequate?

I have yet to see any county roads that are adequate in this respect, usually because of too narrow right-of-way. This, of course, may very well be an insurmontable problem. Some counties, however, have adopted a policy of not considering a road for improvement if adequate right-of-way is not pledged by adjoining property owners. This may be one solution to the problem. It also sometimes provides a good excuse when the funds are not available.

STAGE CONSTRUCTION — BASE FIRST, SURFACE LATER

Consider the design of the road structure to serve the expected volume and weight of traffic. Right here I would like to mention one of the most useful concepts I know of to save construction money, and incidentally, to serve as a good alibi, if one is needed, for mistaken judgment on traffic growth forecasting. The stage construction concept. Simply stated — build only the road structure needed to serve *present* traffic in both structural design and geometrics (width, etc.). Stage construction also allows more time for settlement of utility trenches or poorly compacted bases and fills by constructing only the asphalt base this season and delaying until next season, or beyond, construction of the asphalt surface. This is especially useful for those who must consider subdivision street construction by private developers.

Select Asphaltic Materials for Structural Adequacy

Again, considering road design, there are an indefinite number of good asphalt materials, all of which can be designed for almost any conceivable asphalt road construction need. Materials and methods range all the way from a seal coat treatment through road-mix or cold-mix pugmilled materials laid with a road grader up to the highest quality hot-mixed asphalt concrete laid with an asphalt finishing machine. These materials must be designed for the specific purposes intended, and time does not permit getting into this subject, since an adequate treatment would take several hours. The point being that one must determine the structural design for the pavement, mentioned earlier, and then fit the needs to the type of material most economically

available. Here again, any number of combinations of asphalt binder and aggregate can do the job. Possibly a pit-run aggregate will adequately serve your needs at a fraction of the cost of a State specification material, but these materials must be evaluated as to structural design adequacy. One-inch thickness of a hot-mix asphalt concrete may be the equivalent of x inches of a given cold mix, or of y inches of a given road mix, or of z inches of a compacted stone or gravel base material.

Use of Materials of Appropriate Quality

Possibly a few general remarks may be made concerning the quality of materials to be used. In general, it is poor economy to use high priced aggregate for the base course, and there is no need for it if it is adequately protected from moisture by a good, adequately designed, higher quality surface coarse material. Here, incidentally, is where the Asphalt Institute may be of help. We have developed a complete system, based on the information derived from the AASHO Road Test, for structural design of asphalt pavements. The system also incorporates the AASHO concept of equivalent materials from a structural design standpoint.

Use Existing and New Materials for Required Structural Design

After determining what is needed for the road to be upgraded in the way of structural design, the material in the existing road can be evaluated from the information previously obtained and this structural equivalency subtracted from the required design. The remainder being the amount and quality of material needed to serve the traffic. For example, if structural design requires 4 inches of asphaltic concrete plus eight inches of compacted aggregate base, and presently the roadway has eight inches of stone base plus two inches of asphaltic concrete, an additional two inches of asphaltic concrete overlay will be needed.

CONCLUSION

This may sound like an involved method of setting up a road program, but it is the only way to adequately justify the needs, both to county road officials and to the public, and to insure that the money being spent for the road program is being effectively used to get the most for the road dollar.